A STUDY ON
DETERMINANTS AND
FOETO - MATERNAL OUTCOME
IN
TEENAGE PREGNANCY

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CERTIFICATE

This is to Certify that this dissertation entitled **"A STUDY ON DETERMINANTS AND FOETO-MATERNAL OUTCOME IN TEENAGE PREGNANCY "** is a bonafide work, done by **Dr. K. RAJESWARI** at the Institute of Obstetrics and Gynaecology and Govt. Hospital for Women and Children, Egmore attached to Madras Medical College, Chennai – 3, from 2006 - 2008 under our supervision and guidance in partial fulfillment of the regulations laid down by The Tamilnadu Dr. M.G.R. Medical University - Chennai, for the award of the degree of M.D. in Obstetrics and Gynaecology.

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Introduction

INTRODUCTION

Teenage Pregnancy is defined as an under-aged girl becoming pregnant. The definition of “teens” according to Oxford Dictionary is, years of one’s age from 13-19 years, both inclusive.

Adolescence is the period between puberty and the completion of physical growth, roughly from 11 to 19 years of age (WHO 1975). The term adolescent is often used synonymously with teenagers. Thus teenage is a critical period, the period of “stress and storm” during which the tranquility of childhood ends and the child develops physio-psychological transformation. It is a period of rapid growth, initiation of reproductive process and profound hormonal changes and therefore the adolescent girl has increased nutritional needs for herself. Hence pregnancy during this period places additional stress upon her. So, teenage pregnancy is considered high risk.

Teenage pregnancy is a socio-cultural problem. Rising numbers of teenage pregnancies are often quoted to prove that a society is growing downhill. It is a situation when mothers are yet kids and kids have become mothers.

Teenage pregnancy in developed countries is usually outside of marriage and carries a social stigma in many communities.

In comparison to this, in developing countries like India, teenage pregnancy is usually within marriage and may be welcomed by family and society. Early marriage is a long-established custom in India. The Sarada Act (1921) was enacted forbidding the practice of child marriage. In spite of legislations, child marriage is still in vogue in certain states like Rajasthan, Madhya Pradesh and Uttar Pradesh, where a considerable proportion of marriage occurs when a girl is around 15 years of age.

According to census data, prior to 1951, the average age at marriage for girls in India was 13 years. There is however a gradual rise in this. The Child Marriage Restraint Act (1978) revised the legal age of marriage from 15 to 18 years for girls. Studies indicate that in many States the mean age at marriage has already moved up to 19.5 years (1998).

The age at which a girl marries and enters into sexual life has a great impact on her fertility. Girls who marry before 18 years of age give birth to more number of children than those who married late. About 65% of teenagers aged 17-19 years, in India are either mothers or are pregnant (Chaudhury SK). It is estimated that if the age of marriage is postponed from the age of 16 to 20-21 years, the number of births would decrease by 20-30% (Agarwala SN).

About 1/4th of India's population comprises of girls below 20 years of age and the teenage pregnancy rate varies from 14.1-29% (Gosh & Gosh,

1976). Factors contributing to the high teenage pregnancy rate in our country are early marriage, social custom, low literacy rate, lack of sex-education and non-usage of contraceptive services. There is lack of information about the importance of avoiding pregnancy during the teenage. Added to this, exposure to misguided messages, peer pressure, inquisitiveness about sex leads to premarital sex, increased risk of pregnancy, out-of-wedlock births and abortions.

A pregnant teenager may not be quite fit to bear the burden of pregnancy and labour at a tender age, as efficiently as a woman in her twenties thus placing herself in a high-risk group. The obstetric outcome of teenage pregnancy is influenced by many socio-medical factors. Maternal and perinatal morbidity and mortality in teenagers is influenced by medical complications like pre-eclampsia, anaemia, preterm labour, operative delivery and adverse neonatal outcome. The social problems include out-of-wedlock pregnancy, unwanted pregnancy etc. with the risks of maternal self harm like suicide and abortions. Poor social relationship at home may lead to baby battering and disturbances in maternal behaviour.

Every year according to the WHO, an estimated 2.0-2.4 million adolescents resort to abortion. In India alone, 30% of all induced abortions are performed on women who are under 20.

Adolescent child-bearing initiates a Syndrome of Failure-failure to complete one's education, failure to limit family size, failure to establish a vocation and become independent (Klein, 1978).

Teenage pregnancy is one condition where the obstetric effect of social condition and the social effect of obstetric condition both needs understanding and consideration.

The present study on teenage pregnancy has been undertaken in an attempt to understand the present trends in teenage pregnancy.

Review of Literature

REVIEW OF LITERATURE

According to a report published by the International charity, “Save the children”, 13 million births (a tenth of all births worldwide) each year, are to women aged under 20, and more than 90% of these births are in developing countries. As per the National Centre for Health Statistics (Smith & Colleagues, 1999) women aged 15-19years account for about 13% of all births.

Overall, a third of women from developing countries have birth before the age of 20, ranging from 8% in East Asia to 55% West Africa (BMJ, 2004).

The youngest mother on record is Lima Medina of Peru who delivered by Caesarean section in May 1939. Her age at that time was 5 years and 8 months (Eastman).

The increasing adolescent population with consequent increase in the proportion of teenage pregnancy has drawn more attention to this problem in recent years. Currently one-third of the world’s population is under the age of 15years and will soon enter the reproductive bracket, giving more potential for population growth.

Globally, researchers have gathered substantial evidence in favour of the fact that adolescent pregnancy is a high-risk pregnancy especially in a

primigravida. Poorly managed teenage pregnancies have higher antepartum and intrapartum complications apart from longstanding psychologic sequalae (Sensmen JR & Lamers, 1968).

Complications from pregnancy and child birth were the leading cause of death for girls aged 15 to 19 years in poor countries. Pregnancy in adolescence is associated with maternal complications, preterm birth, low birth weight, perinatal mortality, increased infant mortality and maltreatment of children (Mapanga KA, 2003). A woman in a developing country has a 1 in 65 risk of dying during pregnancy or child birth in the course of her lifetime, which is 33 times higher than that for women in developed countries.

To define this vast difference in sexual and reproductive health, the Population Action International (PAI) has got a “Reproductive Risk Index” with 10 key indicators out of which annual births per 1000 women aged 15-19 years is the prime one. This stresses the fact that teenage pregnancy is a socio-cultural problem with widespread consequences not only on the individual but also on the society and on the economy of the nation.

Industrialized and developing countries have distinctly different rates of teenage pregnancy. The highest rate of teenage pregnancy is seen in the Sub-Saharan Africa -143 per 1000 girls aged 15-19 years, where women get married at much earlier ages. In industrialized nations (USA), the teenage

birth rate was 42/1000 women aged 15-19 years in 2002, the highest in the developed world. In U.K., it was 30.8/1000 women aged 15-19 years.

The teenage birth rate in India is 45/1000 women aged 15-19 years (2002). Various studies have reported different rates from 3.2% to 18.6%.

Author	**Year**	**Incidence (%)**
Philips & Sivakama Sundari	1980	13.10
Pratinidhi et al.	1981-1984	10
Ghosh & Sarker	1987	15.7
Bhalerao	1988	6.3
Pal A et al.	1997	3.2
Madhu C.K. et al.	2000-01	11.6
Arun Nayak et al.	2000-02	6.28

Pregnancy is a biological risk to the adolescent girl who is yet to complete her physical growth (Nag, 1982). Apart from this, there are various social factors like early marriage, low literacy, poor socio-economic status, little or no antenatal care and inadequate knowledge of contraception and reproductive health which all strongly affect the outcome in adolescent mothers.

AGE AT MARRIAGE

Various factors like the age at menarche, literacy, socio-economic conditions, cultural factors and trends in society are affecting the age at marriage.

As many as 40% of all young women aged 15-19 years in India are already married, 17% of adolescent girls aged 13-19 years are already mothers or are pregnant with their first child (Jeejabhoy SJ, 1996). A woman who has her first child before the age of 18 years will have an average of 7 children by the time she has completed child-bearing as compared to a woman who waits until her early 20's, who will have an average of 5 children. (Alauddin M, 1999).

It has been estimated that the Indian birth rate can be reduced by as much as 30% in the 1990's if all Indian woman marry after the age of 19 years (Klenman, 1980).

According to NFHS-II (1998-98), 22% of our population is girls between 10-19 years. Marriage is universal and also early marriage is a long-established custom in India. Gulam (1982) found that 27% married before 11 years of age and 86 % were married by 15 years. The median age of marriage in many states is still 16 years (Sen S, 2004). Shawky et al. concluded that those who married before 16 years remained at increased risk of poor

pregnancy outcome throughout their reproductive lives. Hence despite tradition, early marriage should be discouraged.

Early marriages, that is between 15-19 years, lead to large families increasing the mortality and morbidity of both mother and the child. Thekkekkara observed that the mean interval between marriage and first pregnancy was 1.1 years among teenagers and it was 2.0 years among non-teenagers. According to Falk G et al. teenagers giving birth constituted a high-risk group for future unintended pregnancies and abortion. Many of the teenagers who delivered the first child at 14 or 15 years became mothers of 2 or 3 children by the age of 20 years.

In order to understand the problem of teenage pregnancy, it is important to understand

(1) the determinants of early marriage

(2) the growth and development of adolescents

(3) the nutritional needs of teenagers.

DETERMINANTS OF EARLY MARRIAGE

Fertility means the actual bearing of children. As marriage generally precedes child bearing in our country, age at marriage is intrinsically related with fertility. So factors influencing early marriage include age at menarche, literacy, level of living, cultural factors, unwed pregnancies etc.

Age at Menarche

The age at which females attain menarche is an indicator of their nutritional status and is a determinant of their age at marriage and first birth. Menarche is an important predictor of the timing of marriage, thereby affecting age at first birth. (Tiwari H. et al., 2005).

According to Tanner (1962), menarche was reported to occur at 13.5 years where as it was 12.7 years as per Zacharias et al. (1970) and 12.3 years as per Pritchard et al. (1985). The age at menarche has come down in the past 100 years from 17 years to 13 years (Calman & Bell). It is presumed to be due to improved nutritional status and healthier living conditions.

In India, the mean age at menarche is around 13.5 years (Mitra & Sen 1976). According to Ghai, the mean age at menarche is 12.5 years.

Literacy

Education is a crucial element in economic and social development. Smith (1980) reviewed the marriage pattern in Asia and found a positive correlation between education and marriage. Bloom and Reddy (1988) also found similar results both in rural and urban area. Sarkar (1985) found that lag in female literacy is responsible for the adolescent marriages in states of Madhya Pradesh, Rajasthan, Uttar Pradesh and Bihar. According to 2001 census, in Kerala where there is increased female literacy (88%), the mean age at marriage for girls is raised.

Pregnancy is the most frequent single physical condition causing an adolescent to drop out from school than all other physical or medical reasons.

There is an inverse association between fertility and education status. The National Family Health Survey shows that the total fertility is 1.5 children higher for illiterate women than for women with at least a high-school education (Park). But other socio-economic changes cancel or reduce their effect in several countries.

Education	Total Fertility Rate
Illiterate	3.5
Literate	
(1) Less than middle school complete	2.6
(2) Middle school complete	2.3
(3) High school completed & above	2.0

Source: NFHS-II 1996-1998 (India)

Socio-economic and cultural factors

Poverty is associated with increased rates of teenage pregnancy (Besharov et al., 1997). Economically poor countries such as Niger and Bangladesh have far more teenage mothers compared with economically rich countries such as Switzerland and Japan (UNFPA, 2003). Even within a country, the teenage birth-rates closely matched poverty rates (Males Mike, 2001). Poverty is usually associated with lack of education and an attitude of

irresponsibility in relation to marriage. Qureshi (1981) observed that women with low socio-economic status married earlier than those with higher socio-economic status. The World Population Conference in fact stressed that economic development is the best contraceptive.

The cultural taboos and traditions in certain sects of the society also influences the age at marriage. Also in India, marriage is universal and considered sacramental. Joint family system encourages early marriage and more children. A girl is also more likely to become a teenage mother if her mother or older sister gave birth in her teens (East PL, 2001)

UNWED PREGNANCY

Worldwide, the age at menarche has come down, while the age at marriage is increasing. This extended period of non-marital fecundity, rapid urbanization, more opportunity for interactions with opposite sex, weakening of the traditional, social and cultural control exposes adolescents to the risk of unwanted premarital pregnancy than in the previous generation (Momroy Develas Co A, 1982)

The Indian teenagers-the movers and shakers of New India-especially those in cities, seem to be caught between the two worlds of tradition and modernity. According to a survey conducted by THE WEEK among 15-19 years, 33% of the teens are no more virgin and only 17% will wait till marriage (September 2007).

Premarital sex is rampant and this with inadequate knowledge about contraception has led to more out-of-wedlock pregnancies and abortions. In India, there is considerable social stigma attached to an unwed pregnancy. Social pressures may lead to an illegal abortion or an early marriage. RTI/STIs and drug abuse often complicate these pregnancies.

Women exposed to abuse, violence and family strife in childhood are more likely than those without such experiences to have a teenage pregnancy. Researchers estimate that one third of teenage pregnancies could be prevented by eliminating these exposures. They note that “family dysfunction has enduring and unfavourable health consequences for women during adolescent years, the child-bearing years and beyond” (UNICEF, 2001). Psychological problems like anxiety and depression are also common.

Shailesh Kore et al. (2000) have said that unmarried adolescent pregnancy was more in those with low level of education, lower socio-economic status, unoccupied girl with less structured leisure time, those who lack knowledge of contraception and those who were members of either a single or no parent family.

Wallace (1965) observed that unmarried group received very poor antenatal care and the complications were one-third times that of married women.

ADOLESCENCE AND GROWTH

It is during this period that the completion of physical growth and sexual maturation occurs. A teenager gains about 25 percent of the adult height and 50 percent of the adult weight during puberty. The growth spurt in females occurred between 9.5-14.5 years. The peak weight velocity occurred approximately six months after the peak height velocity. (Tanner et al., 1965). Sukanich et al. (1986) in their study found a difference in the height and weight of younger teenager and older primigravidas. They also observed that although they had not achieved full height and weight their outcome of pregnancy was not different from older primiparas. Scholl et al. (1984) found that the length of gestation was associated with maternal stature and pre pregnant weight.

Steven S & Simon C (1994) observed that the young pregnant adolescents have the potential to grow during and after pregnancy but they do not support the hypothesis that this growth is an obstetrical risk factor. Thame M. and co-workers (1990) found that babies of teenage mothers had low birth weights and smaller head circumference than the control groups. They suggested that teenage girls are not physically mature and as a consequence had babies with low birth-weights and smaller head circumferences.

Nutritional needs of teenagers

Teenagers usually are still growing and developing and thus their nutritional needs are conspicuously increased (Tyre et al., 1987). So, pregnancy during this period places increased nutritional stress upon her.

Nutrition prior to conception and during pregnancy is an important determinant. Those with good nutrition can carry the pregnancy to term and have a normal outcome (Sukanich et al., 1986). Maternal nutrition has been implicated as a causative factor in pre-eclampsia, preterm labour and abruptio placenta. (Chaudhury 1971 & Kaminetzky et al, 1973).

The nutritional needs of pregnant adolescents are the greatest at a time when it is most difficult to meet them. The present day adolescents, because of peer influence and changing life styles, diet and skip meals to maintain their body image. Because of this, they usually enter pregnancy with reduced nutrient stores and increased risk of nutritional deficiencies.

So, all pregnant teenagers should have special dietary counseling. Also the weight gain pattern should be monitored to ensure that energy intakes are sufficient to support a gain of about 0.4 kg (12 lb) per week in the 2nd and 3rd tri mester (Gutierrez Y & King JC, 1993). An additional 400 kcal/day should be advised to the pregnant teenagers along with extra calcium and phosphorus than their older counterparts (William 22nd Ed. p. 194).

Obesity is seen in adolescents who have a strong family history. The relationship between excessive weight and toxemia is a well-known fact.

COMPLICATIONS OF TEENAGE PREGNANCY

Pregnancy in adolescents is considered a high-risk event, because teenage girls are physically and psychologically immature for reproduction.

Health-wise, teenage mothers have a much higher risk for anaemia, pregnancy-induced hypertension, lower genital tract infections, premature labour and delivery etc., in addition to the social effects (Duru Shah, 2005). Pachauri and Jamshedji (1983) found significant number of spontaneous abortions and still births. Khwaja et al. (1986) found anaemia to be twice common in their study group.

The commonly reported pregnancy complications include inadequate prenatal care, pregnancy-induced-hypertension, preterm labour and low birth weight babies. Pregnant teenagers need more attention for the prevention and treatment of pre-eclampsia, eclampsia, anaemia, prematurity and low-birth weight.

Teenage pregnancy increases the risk for preterm delivery, low birth weight and neonatal mortality that is independent of important known confounding factors. Infants born to teenage mothers aged 17 or younger had a higher risk (Chen XK et al., 2007).

Prenatal Care

Research indicate that pregnant teens are less likely to receive prenatal care, often seeking it in the third trimester if at all (Makinson.C., 1985). The reasons suggested for this include, failure to recognize pregnancy, ignorance as to the need of care, casual attitude towards need of care, non-compliance and inappropriate methods of service and delivery.

The Guttmacher Institute reports that one-third of pregnant teens receive insufficient prenatal care and that their children are more likely to suffer from health issues in childhood or be hospitalized than those born to older women.

Pregnant teenagers registered late in a community-based study, with only 40 % early registration. (Sharma AK et al, 2003). In 1997, 7.2 % of mothers aged 15-19 years received late prenatal care compared to 3.9 % for all ages.

Teenage mothers were less likely to make the first prenatal visit in their first trimester (16%) and to have adequate prenatal care. They had higher rates of anaemia, preterm deliveries and lower mean birth weights compared to adult mothers (Thato S et al., 2006). Ndiaye O et al. (2001) in their study in France supported this view.

Little or no care accompanies higher rates of toxemia, anaemia, prematurity and mental retardation as well as increased maternal, prenatal and infant mortality. (Bellard 1971, Wallace 1970).

Goldenberg et al. (2005) from Brazil hypothesized that greater frequency of pregnancy complications occurs when the number of prenatal visits was inadequate.

Lota OM et al. (2004) from their Nigerian prospective study over 14 months concluded that the poor obstetric outcome of teenage pregnancy is related to the non-utilization of prenatal care rather than their biological age. Iloki LH (2004) reported that the mean term at prenatal consultation was 26 weeks gestation.

Geist RR (2006) from his retrospective study on 565 teenage deliveries reported that teenage pregnancy should not be considered as a high-risk situation as long as it is planned and followed with the normal routines of prenatal care.

Hypertensive Disorders Of Pregnancy

Extremes of age (higher in teenage) is a risk factor for pre-eclampsia. Pre-eclampsia is greatest in women younger than 20 years of age. White African – American women younger than 15-17 years of age were found to

have 2.6 times and 2.4 times risk respectively to develop pre-eclampsia compared to their 25-34 year old counterparts (Ian Donald).

Nag (1982) in his study, found that the complications of pregnancy like pre-eclampsia, eclampsia and abruption to be definitely higher in teenagers than their older sisters of 21-24 years. Bhattacharya and Choudhury (1986) in their study of teenagers had found toxemia on the higher side 9.8 % compared to 1.6 % in the controls.

Goonewardene IM (2005) reported that the younger teenagers had a significantly higher risk of gestational hypertension and pre-eclampsia. Malamitsi et al. (2006) also support this fact.

The increased incidence of pregnancy–induced hypertension among pregnant adolescents is largely explained by nulliparity (Treffers PE, 2003).

Chahande MS et al. (2000) from their case-comparison study on 462 teenage mothers reported pre-eclampsia in 20.56 % of their subjects compared with 12.6 % in the older age group. Eclampsia was also significantly high (2.8 % vs 0.6 %) in the study group. On the contrary, Ziadeh. S (2001) reported that the incidence of pregnancy complications like anaemia, pregnancy-induced hypertension were similar in study and control groups.

The incidence of pre-eclampsia and eclampsia by other authors is as follows:

Author	Year	Incidence(%)
Ghosh & Ghosh	1976	8.0
Sarkar CS	1987	10.6
Bhalerao AR	1988	10.0
Shobana patted	1989 - 1993	22.64
Porozhanova	1994	32.0
Dia AT	1999 – 2000	17.5
Arun Nayak	2000 – 2002	8.48
Asha Swarup	2002	11.0

Anaemia

Many studies have reported higher proportion of anaemia in pregnant teenagers than in their older counterparts. This is because of increased demand for the continuing growth and is related to the socio-economic conditions.

Geist RR (2006) found anaemia (41%) to be the only antenatal complication that was significantly increased in his study on teenage pregnancy.

Teenagers are more likely to be anaemic and so they are at increased risk of growth-restricted infants, preterm labour and higher infant mortality (Fraser and associates, 1995).

Anaemia during adolescence worsens during an ensuing pregnancy. This is reflected in the higher incidence of anaemia by various authors like Anandalakshmi PN et al (1993), Soula O (2006), Goonewardane IM (2205), Iloki LH (2004) in their studies on teenage pregnancy.

Incidence of anaemia in various other studies is as follows:

Author	**Year**	**Anaemia(%)**
Bhalerao	1988	25.5
Pal A	1993	27.5
Shobana Patted	1993	25.0
Porozhanova	1994	13.6
Dia AT	2000	25
Arun Nayak	2000-02	15.62
Asha Swaroop	2002	20
Elias Kovoor	2005	23

TEENAGERS AND PELVIC FACTOR

There are contradictory views about the frequency of contracted pelvis in adolescents and this absence of unanimity may be due to lack of uniformity in methods and dissimilarity in the age of patients studied.

The pelvic bones of female adolescents continue to grow for several years after growth in height has been completed. If pelvic growth is not completed before child birth, there is an increased chance of obstructed labour and vesico-vaginal fistula (WHO, 1999). The younger patients experiencing shorter growth periods before conception therefore would exhibit a greater proportion of contracted pelvis (Ballard & Gold, 1971).

Treffers (2003), Mc Anarney ER (1987) and Sukanich AC (1986) concluded that “biologic immaturity” does not affect appreciably the reproductive performance of teenagers in terms of length of labour and route of delivery. In fact, the likelihood of operative delivery is not increased.

MODE OF LABOUR AND DELIVERY

Many studies have shown an increased number of vaginal deliveries (both spontaneous and instrumental) compared to the control group. The probable reason could be the smaller size of babies born to such mothers as hypothesized by many authors like Verma and Das KB (1999), Dia AT (1999-2000), van Eyk N et al. (2000) and Ziadeh S (2001).

Operative deliveries were found with increased frequency by Israel and Wountersz (1963), 54.1% as against 44.4% in control. Mesleh RA in his one year study of 2522 teenage pregnancies reported the rate of instrumental and caesarean section as 9% and 6% in study group compared to 5% and 10% in control group, respectively.

Overall the incidence of instrumental deliveries has come down even for the general population.

Mode of labour in various studies:

Author	**Year**	**Vaginal deliveries %**	**Instrumental deliveries %**	**Caesarean section %**
Shobana patted	1989-93	57.0	11.25	31.00
Pal A	1992-93	-	17.4	-
Kavitha N. Singh	1997-98	64.65	1.39	14.41
Van Eyk N	2000	-	19.7	6.2
A.K.Sharma et al.	1999-2000	95.3	-	4.9
Elias kovoor	2005	78	11	11
M.S. Chahande	2000	-	-	27.3
Geist R.R	2006	72.7	17.4	9

Anzar and Bennet (1965) reported an increase in primary caesarean section rate by 28 % in patients 15 years or under. Dwyer et al. (1974) have reported a low caesarean rate of 2.6 % overall. They concluded that female pelvis is not contracted because it is fully grown before a girl is physiologically old enough to reproduce. Pereira et al. (1999) in their Mexican study on 296 cases reported a rate of 44.1% for caesarean section, 35.6 % for eutocia and 20.3 % for instrumental labour.

Sheetal Dholakia et al. (1997) who did a comparative study of teenage pregnancy a decade apart reported a rise in the incidence of caesarean section from 4.07 % in 1987 to 13.17 % in 1997.

The main indications for caesarean section were cephalo-pelvic disproportion, abnormal presentation or foetal distress. Bhalerao AR (1988), MS Chahande (2000), Nitwe et al (1989) agreed with these findings.

Unfier V & Plazze Garnica JA (1984-1993) have reported an increased incidence of caesarean section, spontaneous abortion, IUGR and fetal distress and hypothesized that the relative state of hypo-arterialization characteristic of adolescent uterus may be involved in the pathology of these.

OTHERS

Obstetric Haemorrhage is the singlemost common cause responsible for 25% of maternal deaths worldwide. Briggs (1981) found increased incidence of PPH.

Other complications like urinary tract infections (20.4%), prelabour rupture of membranes, sexually transmitted diseases have been studied by few others, with varied results.

Lacerations of genital tract (7%) are more in teenage patients especially those with instrumental deliveries (Pereira et al., 1999).

No difference was found in puerperal complications between teenagers and adults. (Mathias et al. 1985 & Niture et al. 1989). Increased incidence of endometritis was a significant finding in the studies of Mussio and Reyan, Schneridee 1978 and Pereira 1999.

PERINATAL CONSIDERATIONS

Most studies from developed and developing countries have consistently reported that teenage pregnancy is at increased risk for preterm delivery and low birth weight.

Rogers (1996) and Yoder et al.(1997) found that young maternal age was an independent risk factor for adverse birth outcomes. The increased risk probably was due to other factors like low socio-economic status, unwed pregnancy and inadequate prenatal care.

Satin et al. (1994) concluded that teenage pregnancies aged between 16 and 19 years had no risk for intrinsic maternal youth and the obstetric risk is increased only in teenagers less than 16 years of age. But Fraser et al. (1995)

suggested that young age conferred an increased risk of adverse pregnancy outcome, which was intrinsic to maternal youth.

First teenage births are not independently associated with an increased risk of adverse pregnancy outcome and are at low risk of delivery by caesarean section. However second teenage birth are associated with an almost three-fold risk of preterm deliveries and stillbirths (Smith GC et al., 1992-98).

Mathias et al. (1985) found a greater frequency of premature births among 9-16 years old. The main obstetric completion is preterm birth, especially if the interval between menarche and conception is short (Treffers PE., 2003).

Hishan et al. (1987) have reported that a high proportion of teenage mothers with low-birth-weight babies were less than 50 kg and measured less than 150 cm in height. There was positive correlation between anaemia during pregnancy and low-birth-weight babies.

Chahande MS (2000) reported 16% preterm deliveries in the study group of 464 teenagers which was five times more than the control group, and low-birth-weight babies about 72.6% in the study group and 59.2% in the control group. Bradford and Giles (1989) in their study of adolescents found mean gestational age of delivery equivalent with control group.

Author	Year	Prematurity (%)	Low Birth Weight(%)
Sarkar C.S.	1987	20.1	30
Bhalerao AR	1988	16	46.2
Shobana patted	1989-93	12.83	-
Van Eyk .N	1994-98	13.5	13.4
Ndiaye O	1998	-	23
Arun Nayak	2000-02	12.5	-
Madhu. C.K	2001	-	54
Asha Swaroop	2002	32	-

Perinatal mortality

Perinatal mortality is highest for babies of mothers under 20 years (RCOG). It was related to prematurity, pre-eclampsia, illegitimacy and young age of mother. The higher perinatal mortality in the infants of young teenagers is due in part to the higher percentage of low birth weight (Straton JA.).

Sudarsan Saha et al. in a clinical audit of perinatal mortality (Retrospective 1995-97, Prospective 1998-2000) have commented that perinatal mortality in teenage pregnancy and above 30 years is alarming. The audit suggests marital and child-bearing age should be within 20-30 years and

compulsory antenatal care to reproductive mothers. It was estimated that less than three antenatal visits was associated with 91.34% perinatal loss and it was only 8.66% with more than three visits.

Pratinidhi et al. (1984) in their study on 598 teenage deliveries reported a perinatal mortality rate of 67.2 per 1000 births. The perinatal mortality rate of India is 44.0 per 1000 live births in 1999.

Chen XK et al. (2007) in their large population based retrospective cohort study have concluded that teenage pregnancy increases the risk of adverse birth outcomes that is independent of important known confounding factors like low socio-economic status, inadequate prenatal care and inadequate weight gain during pregnancy.

Ballerao AR (1988) reported a perinatal mortality rate of 65.2 per 1000 live births.

CONGENITAL ABNORMALITY

The pregnant adolescent is at slightly greater risk of having a baby with a birth defect than a woman aged 20-30 years. In teenage, anencephaly, spina bifida and meningocele are common. In India, more consanguineous marriages could be one explanation.

In the Russel series, congenital anomalies in teenage patients below 16 years of age was about 20%.

MATERNAL MORTALITY

It is a well known fact that maternal mortality increases at either extreme of reproductive years. The maternal mortality rate for India is very high at 407/100,000 live births in 2000. The maternal mortality rate for girls aged 15-19 years is 380/100,000 live births and is much higher than that for older women.

A report of the State of the World's Mothers, states that complications from pregnancy and child birth were the leading cause of death for girls aged 15 to 19 years in poorer countries.

According to the WHO, in several Asian countries including Bangladesh and Indonesia, a large proportion (26-37%) of death among female adolescents can be attributed to maternal causes.

Maternal mortality among mothers aged 15-19 years is high as compared to that among the mothers in 20-24 years age group (Pathak KB, Ram F et al., 1993).

ABORTION PROBLEM IN TEENAGERS

A significant number of teenage pregnancy ends in abortions either spontaneous or induced. In all parts of the world, particularly in urban areas, an increasing number of all those having abortion are unmarried adolescents.

Worldwide, an estimated 46 million pregnancies are terminated each year out of which 36 million take place in the developing world. Twenty million of these abortions are carried out under illegal and often unsafe conditions (PAI, 2001). One woman dies every 7 minutes from illegal abortions in the developing countries.

The unmarried teenagers usually report late for termination (around 10 weeks) and if they go to untrained doctors, the consequences can be disastrous. 30% of all Indian induced abortions are performed on women who are under 20.

Russel (1974) reported his experience with induced abortion in 50 adolescents. He found more risk of trauma in his series and a high proportion of spontaneous abortion and premature delivery in subsequent pregnancies.

Pregnancy wastage was about six times more common in adolescent pregnancies (Sharma AK, 1999). Ambedkar et al. (1999), in a record based study undertaken in Nagpur in a sample of 1830 teenage pregnancies reported still births to be higher among teenagers.

The abortion rate for India as per the National Family Health Survey-II is 10.1%. According to population survey in 1999, the teenage abortion rates in women aged 15-19 years were as follows:

Country	Birth rate*	Abortion rate*
UK	30.8	21.3
France	9.3	13.2
Sweden	6.5	17.7
Netherlands	6.2	3.9

* per 1000 women aged 15-19 years.

CONTRACEPTION AND HIV IN ADOLESCENTS

Premarital sexuality has become a reality even in our country. A survey done by “The Week” in September 2007 reveals that 33% teens are no more virgin and only 17% of Indian teens will wait till marriage. Generation now is experimenting with sex. But they are less aware about the reproductive pathology and contraceptive practices.

A survey reveals that 63% of adolescents are aware of condoms, 39% about IUCD. There is less awareness about oral contraceptive pills and post-coital contraception.

Unprotected sexual activity, unplanned pregnancies, unsafe abortions, and exposure to STDs/HIV are common in adolescents. HIV infection disproportionately affects the teenaged girls. Every year almost half of all new HIV infections and at least one-third of all new sexually transmitted infections occur among people younger than 25 years (PAI, 2001). AIDS as a

STD was known in over 70 percent while gonorrhoea and syphilis were less known (Watsa, 1994). Here lies the special importance of contraception for teenagers nowadays.

Condoms seem worthwhile because of their additional protection against STDs and AIDS. Hormonal methods seem perfectly suitable for adolescents since they are reversible. Monthly or trimestrial injections are also appropriate. The IUCD is not a good method because of the increased risk of infection. Teenagers should be made aware of post-coital contraception. Ensuring confidentiality by the care providers is very important. It would be beneficial for schools to provide counseling as part of their sex education program (Siegberg R, Nillson CG., 1987).

Until June 1993, more than 100,000 cases of AIDS were reported among persons 20-29 years of age. Given the prolonged latent period for the development of AIDS, one can assume that most of these persons are infected with HIV during adolescence.

The same risk factors for contracting other STDs including psycho-social and behavioural factors, place the adolescent at risk for HIV. Behavioural modifications including knowledge of HIV status and appropriate preventive counseling needs to be done (Vermillion et al., 2000).

IMPACT ON THE MOTHER

Stine, Rider and Sweeny have reported in their studies that pregnancy is the most frequent single physical condition causing an adolescent to leave school prior to graduation. More than twice as many adolescent females left school, with pregnancy as the stated reason than from all other physical or medical reasons. Probably, by preventing teenage pregnancy the number of school drop-outs can be reduced.

Young motherhood in an industrialized country can affect employment and social class. Single motherhood is associated with social stigma. They experience isolation, low self esteem, guilt accompanied by stress and depression due to lack of a support group.

The financial, emotional and medical needs of the infant may be too difficult for a teenager to manage.

Teens may not have good parenting skills or have the social support systems to help them deal with the stress of raising an infant.

IMPACT ON THE CHILD

Infants born to teenage mothers are at higher risk of complications like prematurity, low birth weight, accidental trauma, minor acute infections and lack of immunization or vaccination and development delays.

Low birth weight babies may have organs that are not fully developed. This leads to respiratory problems such as respiratory distress syndrome or intra-ventricular bleeding etc.

Children whose mothers were aged 17 years or younger when they were born tend to have more school difficulties and poor health than children whose mothers were 20 when they were born (March of Dimes).

Children born to teenage mothers are less likely to receive proper nutrition, health care and cognitive and social stimulation. As a result, they may have an under developed intellect and attain lower academic achievements.

Children born to teenage mothers are at a greater risk for abuse and neglect.

Daughters born to adolescent parents are more likely to become teen mothers themselves.

Aim & Objectives

AIM AND OBJECTIVES

Aim of the study

(i) To find out the proportion of teenage pregnancies both wanted and unwanted.

(ii) To analyze the determinants of pregnancy in adolescents.

(iii) To study the maternal and foetal outcome of teenage pregnancy and the various factors affecting it.

(iv) To look into the complications of teenage pregnancy.

(v) To study about the problem of abortions in teenagers.

Objectives of the study

(i) To find out the measures to improve the adolescent reproductive and sexual health.

(ii) To find out strategies for reducing the number of teenage pregnancies.

Materials & Methods

MATERIALS AND METHODS

The present study on teenage pregnancy was conducted in the Government Hospital for Women and Children, Institute of Obstetrics and Gynaecology, Egmore, Chennai. It is a 750-bedded-tertiary care institution, serving for the population in and around Chennai.

This is a study of 300 pregnant teenagers who were admitted and delivered at IOG during a period of one year from September 2006 to August 2007. Patients were admitted to labour ward directly or through the antenatal ward of respective units. Patients include those admitted for delivery (term, preterm, IUD), abortion and medical termination of pregnancy.

The study group comprises of 300 pregnant patients aged 19 years or less and were selected in a systematic random method. (first 25 teenage pregnancies in every month). The control group comprises of 300 cases of primi gravida (as 85% of study group were primi gravida) of age 20-29 years selected randomly. The control group was analyzed only regarding the antenatal complications, mode of delivery, pregnancy outcome and neonatal complications and compared with the study group. Patients admitted for MTP and miscarriage are also included in the study. In the study group, details regarding their socio-economic status, income, age at menarche, age at marriage, consanguinity, antenatal check-ups, ante-natal history, knowledge about contraception, HIV/AIDS were collected.

Examination included general, systemic and ante-natal examination which included height, weight, pallor, edema legs, blood pressure, systemic examination and routine obstetrical examination. Investigations were collected from AN records if available, or done freshly as and when needed. Period of gestation was derived from history of LMP, Examination and USG report (if available).

Complications if any in antenatal, intra-partum and post-partum period were noted. Onset of labour, mode of delivery, maturity, weight, Apgar score of the baby, congenital malformation (if any) and neonatal admissions were recorded. Patients followed till their discharge. Babies were followed till early neonatal period. The data entered in a proforma was finally analyzed.

Patients with persistent blood pressure of 140/90 mm of Hg or more in more than one occasion were considered as having PIH. Patients with Hb<11 gm% were considered anaemic (as per ICMR category of anaemia). Patients getting labour pains prior to 37 completed weeks of gestation were considered as pre-term. Babies with birth weight less than 2.5 kg were grouped as low birth weight babies.

Regarding abortions, details about the type of abortion, duration of pregnancy, method of induction of abortion and complications if any following abortion were recorded.

Clinical and demographic variables were expressed as frequencies and percentages and analyzed using Pearson's Chi-Square test.

Limitations of the study:

Study and control groups were selected in a random manner. IOG being a referral hospital, many of the cases were referred with complications. However an attempt has been made to study the social and medical consequences of adolescent pregnancy in the hospital setup.

Observations

OBSERVATIONS

TABLE : 1

AGE DISTRIBUTION OF STUDY GROUP

Age (in years)	Number	Percentage
15	2	0.6
16	5	1.7
17	11	3.7
18	87	29.0
19	195	65
Total	**300**	**100**

- Mean age of the cases is 18.56 years
- None of them were below 15 years.

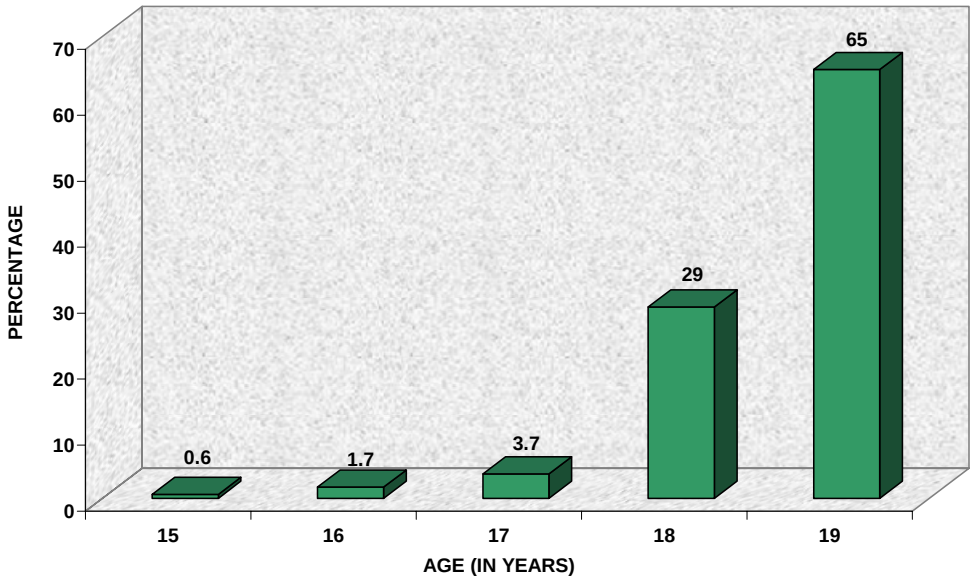
TABLE : 2

PARITY OF THE STUDY GROUP

Parity	Number	Percentage
Primigravida	260	86.7
Gravida-II	34	11.3
Gravida-III	6	2.0
Total	**300**	**100**

- About 86% of the patients were primigravida.
- There were 6 patients who were pregnant for the third time in their teens.

AGE DISTRIBUTION OF STUDY GROUP



PARITY OF THE STUDY GROUP

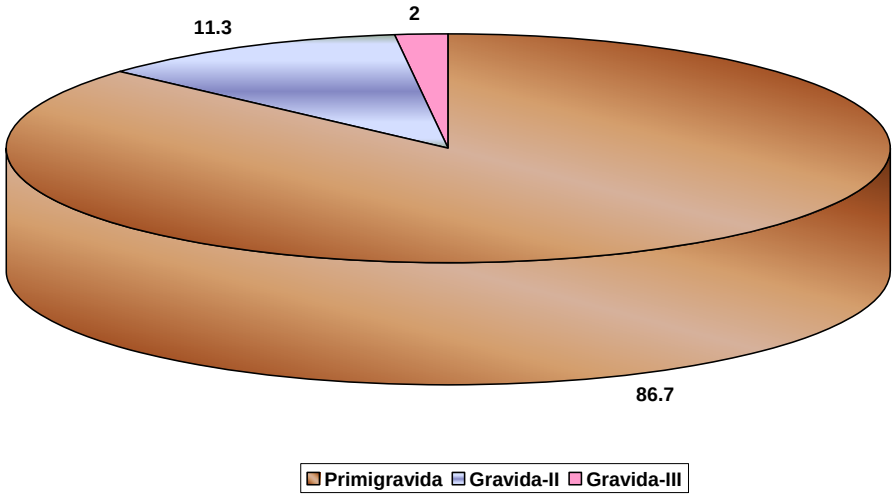


TABLE : 3

EDUCATIONAL STATUS OF PREGNANT TEENAGERS

Education	**Number**	**Percentage**
Illiterate	42	14
1^{st}-5^{th} std	75	25
6^{th}-8^{th} std	102	34
9^{th}-10^{th} std	72	24
11^{th}, 12^{th} and above	9	3
Total	**300**	**100**

- 14% of the study group were illiterates.
- 25% had only primary education.

TABLE : 4

INCOME OF THE STUDY GROUP

Income (per month in rupees)	**Number**	**Percentage**
< 750	104	34.7
750-1500	192	64.0
>1500	4	1.3
Total	**300**	**100**

- Almost all of them belonged to lower class of socio-economic status

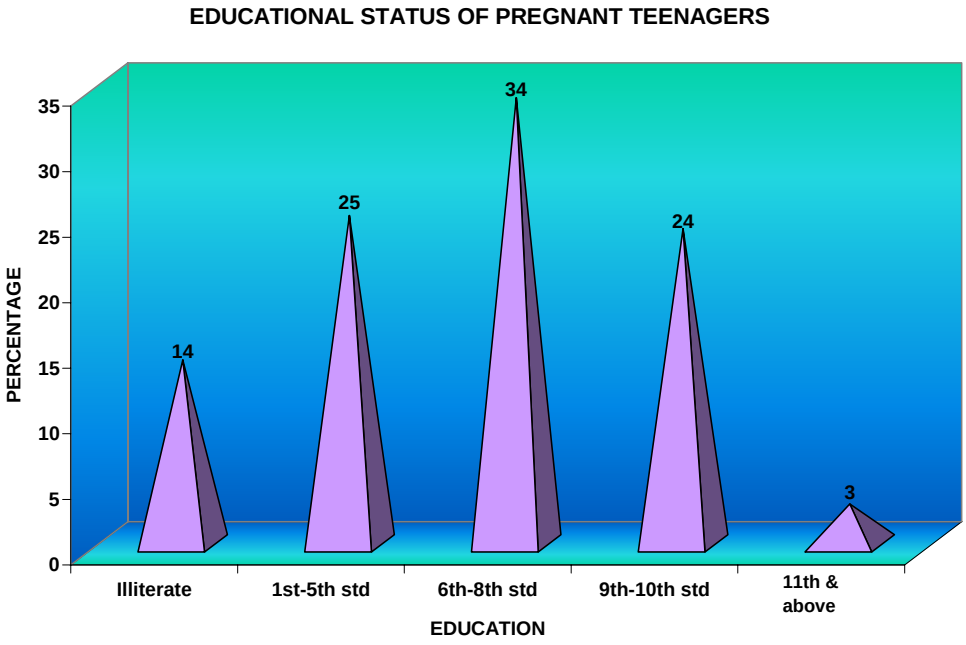

EDUCATIONAL STATUS OF PREGNANT TEENAGERS
PERCENTAGE
35
30
25
20
15
10
5
0
14
25
34
24
3
Illiterate
1st-5th std
6th-8th std
9th-10th std
11th & above
EDUCATION

TABLE : 5

AGE AT MARRIAGE OF TEENAGERS

Married teenagers : 290

Unmarried teenagers : 10

Age (in years)	Number	Percentage
14	3	1.0
15	4	1.4
16	54	18.6
17	114	39.4
18	110	37.9
19	5	1.7
Total	**290**	**100**

- Average age at marriage: 17.77 years.
- About $1/5^{th}$ were married by 16 years of age.
- 98% married by 18 years of age.

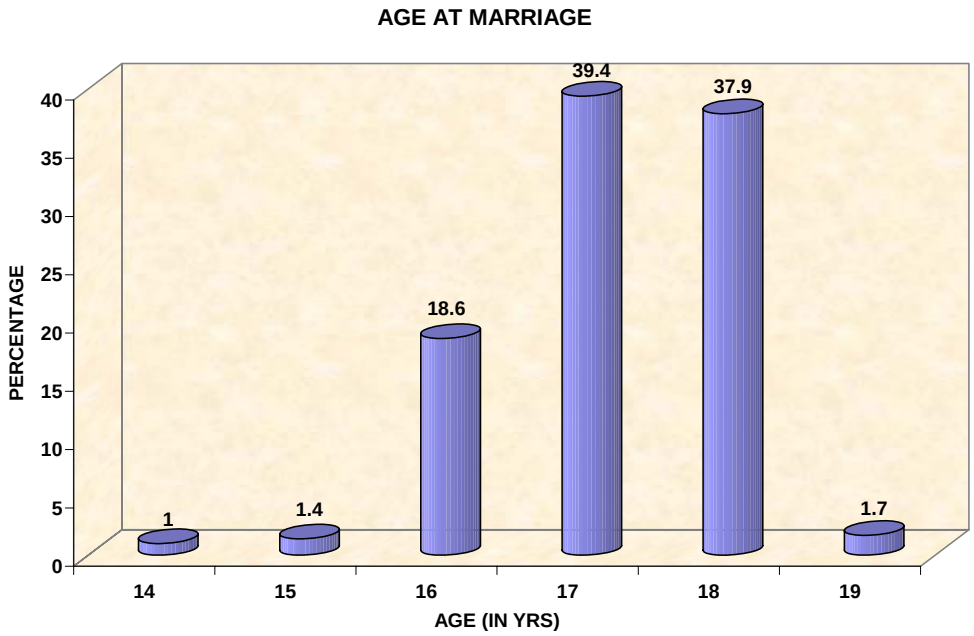

AGE AT MARRIAGE
PERCENTAGE
40
35
30
25
20
15
10
5
0
1
1.4
18.6
39.4
37.9
1.7
14
15
16
17
18
19
AGE (IN YRS)

TABLE : 6

AGE OF MENARCHE OF STUDY GROUP

Age at menarche (in years)	Number	Percentage
11	5	1.7
12	68	22.6
13	96	32.0
14	86	28.7
15	42	14.0
16	3	1.0
Total	**300**	**100**

- Average age at menarche : 13.3 years.

TABLE :7

CONSANGUINITY OF MARRIAGE

Married teenagers: 290

Unmarried teenagers : 10

Consanguinity	**Number**	**Percentage**
Consanguineous	92	31.7
Non-Consanguineous	198	68.3
Total	**290**	**100**

- About 1/3rd of pregnant teenagers had consanguineous marriage.

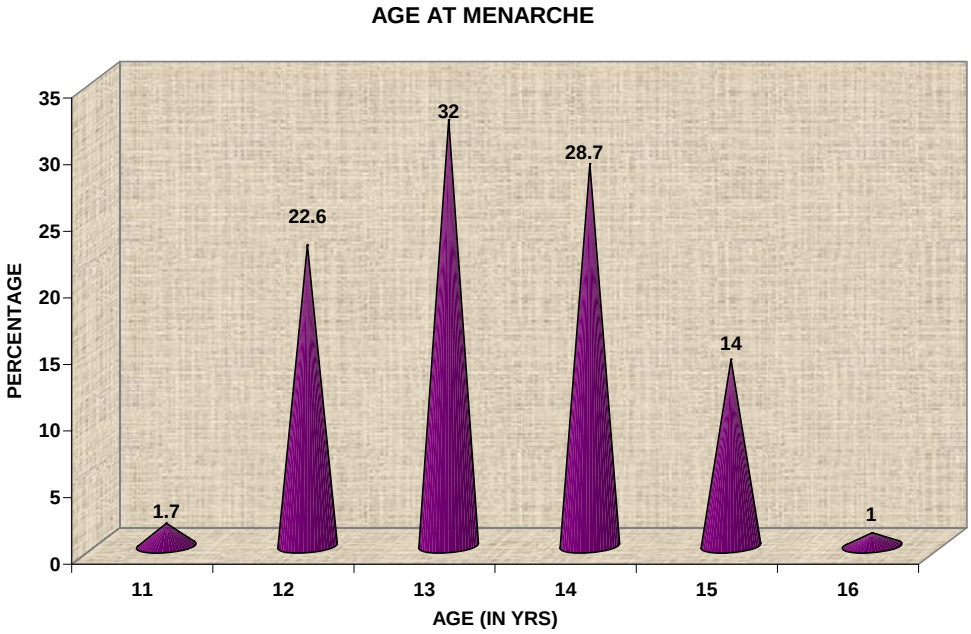

AGE AT MENARCHE
PERCENTAGE
35
30
25
20
15
10
5
0
1.7
22.6
32
28.7
14
1
11
12
13
14
15
16
AGE (IN YRS)

TABLE : 8

MARRIAGE-CONCEPTION INTERVAL

Married teenagers: 290

Unmarried teenagers : 10

Interval (in years)	Numbers	Percentage
<1	238	82.1
2	47	16.2
3	5	1.7
Total	**290**	**100**

- More than 80% of the teenagers conceived within one year of marriage.

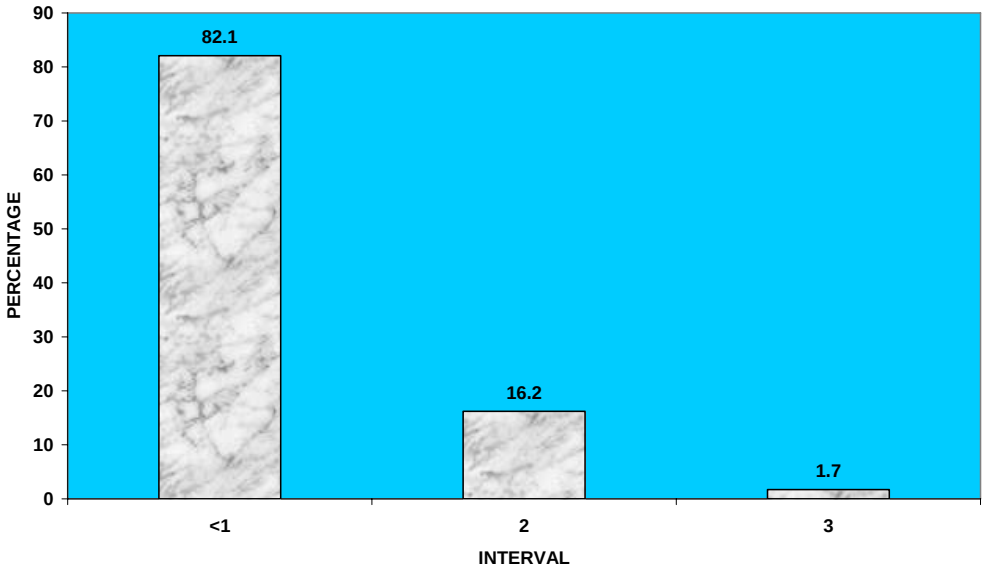
TABLE : 9

ANTENATAL CARE

Antenatal care	Number	Percentage
Booked	224	81.2
Un booked	52	18.8
Total	**276**	**100**

- There were 24 cases of abortion (spontaneous and MTP)
- 18.8% of the study group were un booked; but all of them were immunized against tetanus.

MARRIAGE -CONCEPTION INTERVAL



ANTENATAL CARE

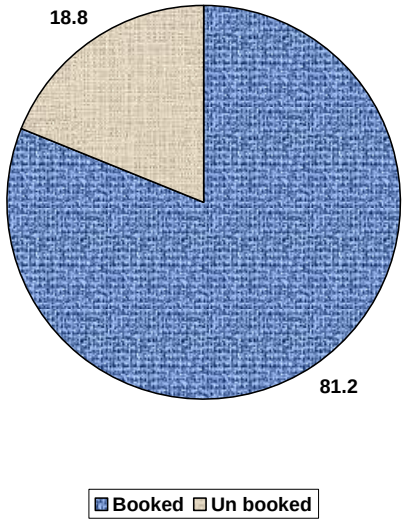


TABLE : 10

MATERNAL HEIGHT

Height (in cm)	Number	Percentage
≤ 145	42	14
146-150	87	29
151-155	105	35
156-160	55	18.3
> 160	11	3.7
Total	**300**	**100**

- 14% of teenagers were less than 145 cm in height.
- 43% of teenagers were less than 150 cm in height.

TABLE : 11

MATERNAL WEIGHT

Weight (in kg)	Number	Percentage
≤ 40	33	11
41-50	48	16
51-60	195	65
>60	24	8
Total	300	100

- 11% of pregnant teenagers were under 40 kg weight.

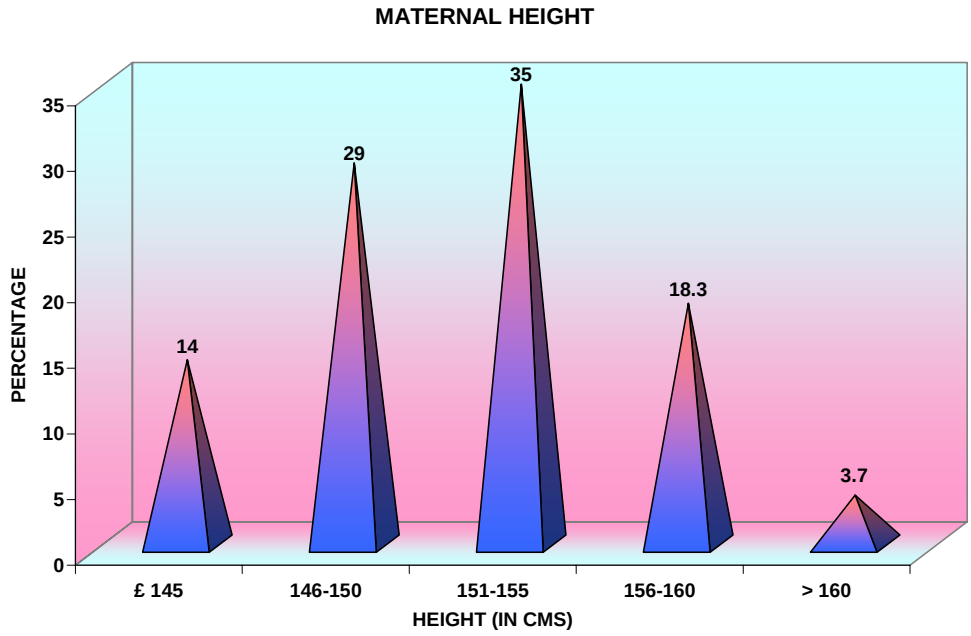

MATERNAL HEIGHT
PERCENTAGE
35
30
25
20
15
10
5
0
14
29
35
18.3
3.7
£ 145
146-150
151-155
156-160
> 160
HEIGHT (IN CMS)

TABLE : 12

MATERNAL COMPLICATIONS

S. No	Complications	Study group		Control group		P value
		Number	Percentage	Number	Percentage	
1	Anaemia	264	88	230	76.7	0.01
2	Pre-eclampsia	71	25.72	35	12.3	0.001
3	Eclampsia	4	1.45	0	0	0.001
4	Abruption	8	2.9	2	0.7	0.058
5	Preterm labour	54	19.6	30	10.5	0.009
6	Twins	8	2.7	10	3.3	0.637
7	Malpresentation	21	7.6	20	7.0	0.876
8	Medical Diseases Complicating Pregnancy	7	2.3	9	3.0	0.617
9	IUD/Still birth	15	5.4	5	1.8	0.025
10	Abortions	24	8.0	15	5.0	0.150
11	PROM/MRO	9	3.3	5	1.8	0.285

- Antepartum complications were more common in un-booked cases.
- In the study, anaemia, Pre-eclampsia, Preterm labour and still births were the predominant complications noted.

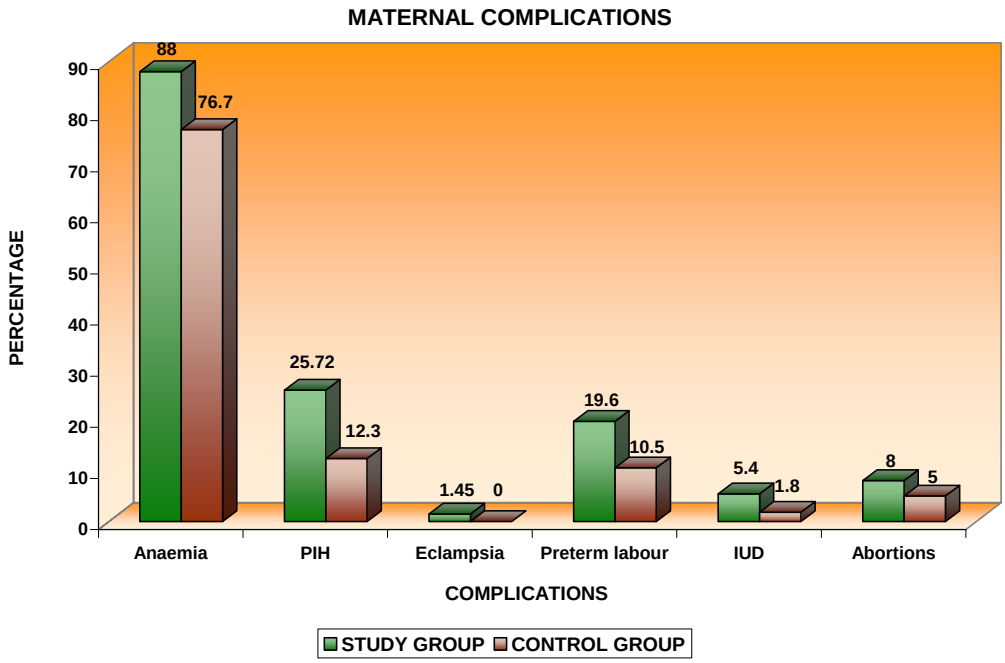

MATERNAL COMPLICATIONS
PERCENTAGE
90
80
70
60
50
40
30
20
10
0
88
76.7
25.72
12.3
1.45
0
19.6
10.5
5.4
1.8
8
5
Anaemia
PIH
Eclampsia
Preterm labour
IUD
Abortions
COMPLICATIONS
STUDY GROUP
CONTROL GROUP

TABLE : 13

ANAEMIA IN TEENAGERS

Anaemia (Hb in gm %)	Study group		Control group	
	Number	Percentage	Number	Percentage
Mild (10-10.9)	73	27.7	64	27.83
Moderate (7-9.9)	188	71.2	166	72.17
Severe (4-6.9)	3	1.1	0	0
Very severe (< 4)	0	0	0	0
Total	**264**	**100**	**230**	**100**

- There was no significant difference in the severity of anaemia in the two groups.
- Chi-Square= 2.781, p=0.24.

TABLE : 14

MODE OF DELIVERY

Mode of delivery	Study Group		Control Group	
	Number	Percentage	Number	Percentage
Spontaneous vaginal	180	65.22	186	65.26
Forceps and Vaccum	13	4.71	12	4.21
Assisted Breech Delivery	11	3.98	10	3.51
Spontaneous expulsion of Dead fetus	4	1.45	2	0.70
Caesarean	67	24.28	75	26.32
Hysterotomy	1	0.36	0	0
Total	**276**	**100**	**285**	**100**

- About 3/4th of the patients in the study group delivered vaginally.
- There is no difference in the mode of labour in the two groups
- Chi-Square= 2.159, p=0.82

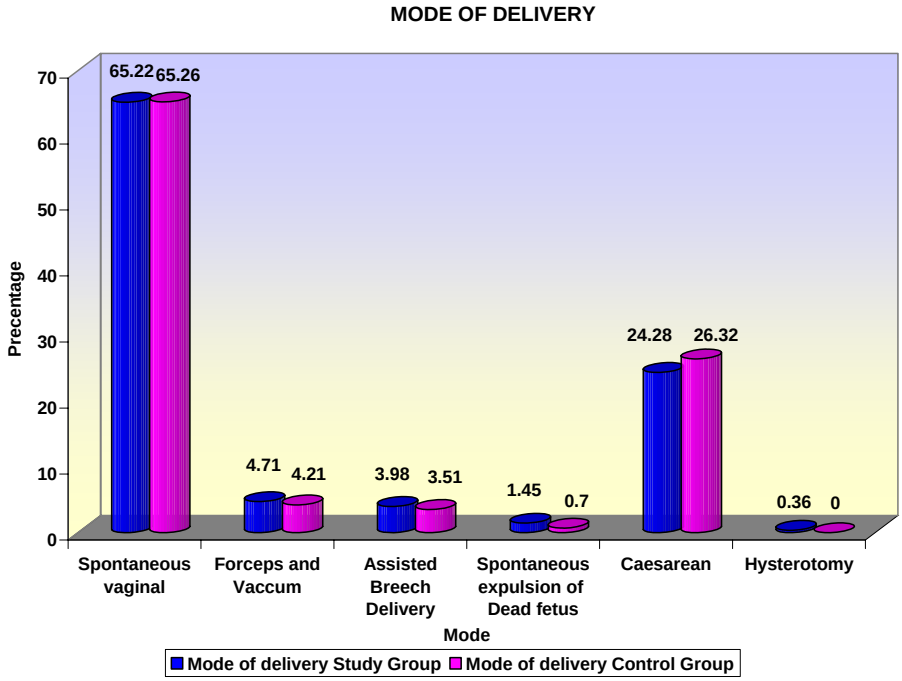

MODE OF DELIVERY
Precentage
70
60
50
40
30
20
10
0
65.22
65.26
4.71
4.21
3.98
3.51
1.45
0.7
24.28
26.32
0.36
0
Spontaneous vaginal
Forceps and Vaccum
Assisted Breech Delivery
Spontaneous expulsion of Dead fetus
Caesarean
Hysterotomy
Mode
Mode of delivery Study Group
Mode of delivery Control Group

TABLE : 15

INDICATION FOR CAESAREAN DELIVERY

Indication	**Number**	**Percentage**
CPD	17	25.01
Feotal Distress	11	16.18
Malpresentation	12	17.65
Failed induction	5	7.35
Failed Acceleration	3	4.41
Abruption	4	5.88
Eclampsia	3	4.41
Imminent Eclampsia	5	7.35
Previous LSCS	3	4.41
Others	5	7.35
Total	**68**	**100**

- CPD was the most common indication (25%) for LSCS in the study group.

TABLE :16

REASONS FOR ICU ADMISSION

Reason	**Number**	**Percentage**
Eclampsia	4(1)	15.38
Abruption	2	7.70
Severe PIH	15	57.69
Heart Disease	4(1)	15.38
LRI	1	3.85
Total	**26 (2)**	**100**

- There were 2 maternal deaths in the study group one due to CCF/Pulmonary edema and other due to Eclampsia with HIE.

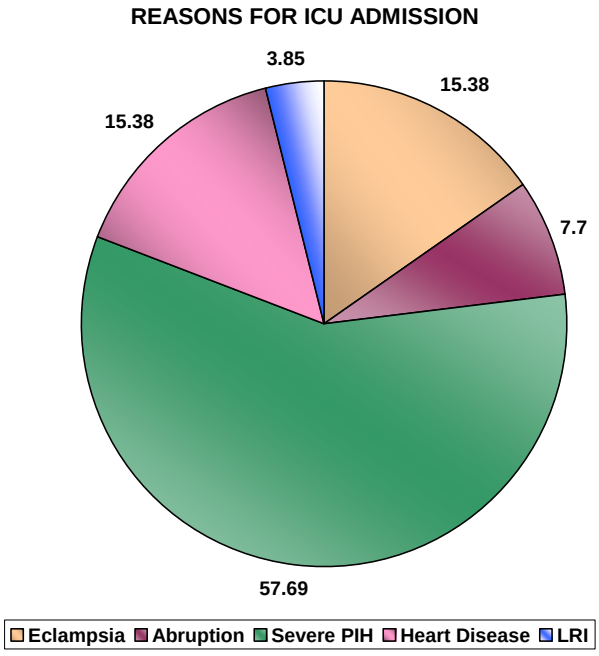

REASONS FOR ICU ADMISSION
3.85
15.38
15.38
7.7
57.69
Eclampsia
Abruption
Severe PIH
Heart Disease
LRI

TABLE : 17

BIRTH WEIGHT OF INFANTS

Weight (in kg)	Study Group		Control Group	
	Numbers	**Percentage**	**Numbers**	**Percentage**
<2	28	10.33	18	6.21
2-2.4	58	21.40	32	11.03
2.5-3	144	53.14	172	59.31
>3	41	15.13	68	23.45
Total	**271**	**100.00**	**290**	**100.0**

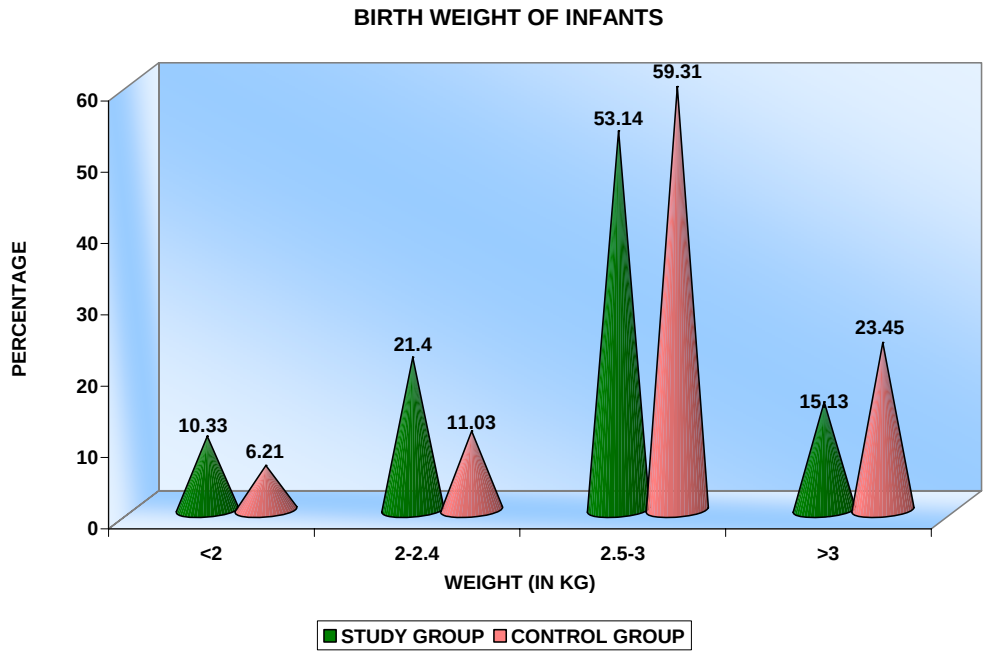
- In our study, 31.73% of babies born to teenagers weighed less than 2.5kg.
- Chi-Square=18.232, p= <0.001.

TABLE : 18

NEONATAL OUTCOME

Outcome	Study Group		Control Group		P value
	Numbers	**Percentage**	**Numbers**	**Percentage**	
Normal	168	61.99	233	80.34	0.001
Prematurity	54	19.93	30	10.34	0.009
LBW	86 [37(t) +49(p)]	31.73 [13.65+ 18.08]	50 [12(t)+ 38(p)]	17.24 [4.14(t)+ 13.10(p)]	0.002
BA	39	14.39	18	6.21	0.005
Early Neonatal Death	16	5.90	8	2.76	0.05
Total	**271**	**-**	**290**	**-**	**-**

- Prematurity and low birth weight were the common neonatal complications noted.


BIRTH WEIGHT OF INFANTS
PERCENTAGE
60
50
40
30
20
10
0
10.33
6.21
21.4
11.03
53.14
59.31
15.13
23.45
<2
2-2.4
2.5-3
>3
WEIGHT (IN KG)
STUDY GROUP
CONTROL GROUP

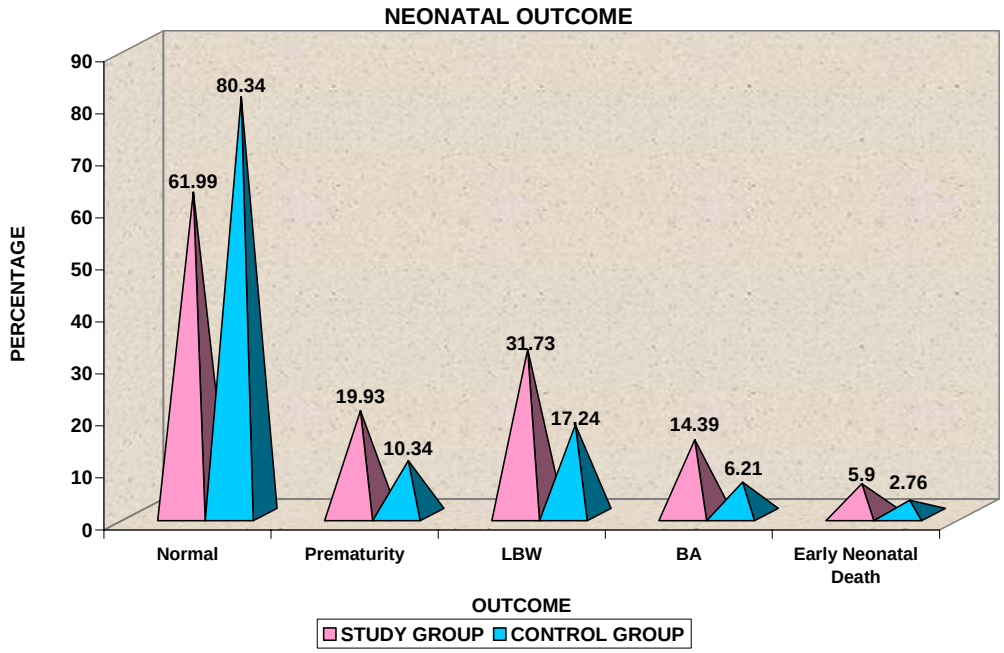

NEONATAL OUTCOME
PERCENTAGE
90
80
70
60
50
40
30
20
10
0
61.99
80.34
19.93
10.34
31.73
17.24
14.39
6.21
5.9
2.76
Normal
Prematurity
LBW
BA
Early Neonatal Death
OUTCOME
STUDY GROUP
CONTROL GROUP

TABLE : 19

TYPE OF ABORTION

Abortion	Number	Percentage
Complete& Incomplete	12	50.0
Missed	4	16.7
Vesicular mole	2	8.3
Induced (MTP)	6	25.0
Total	**24**	**100**

- About 1/4th of the abortions were induced abortions.

TABLE : 20

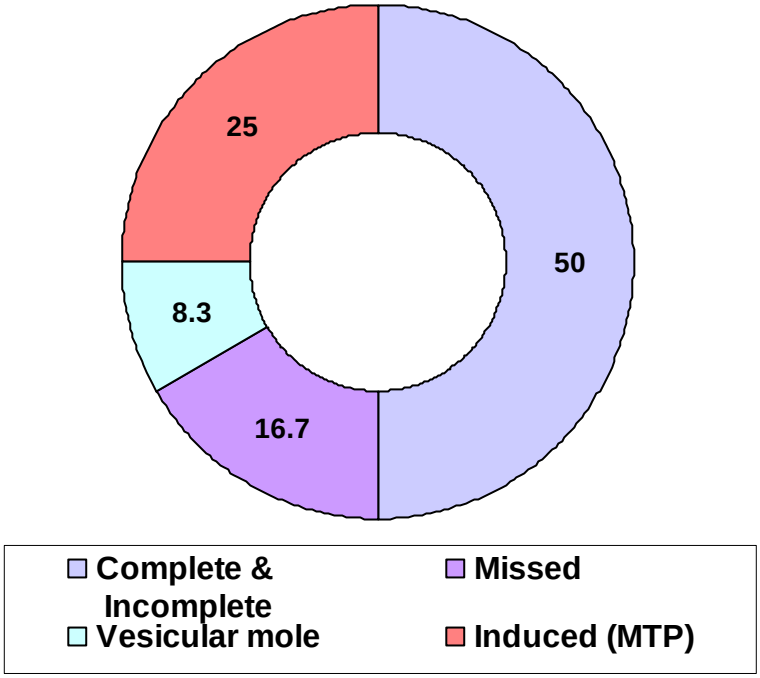
PERIOD WHEN ABORTION WAS PERFORMED

Period	Spontaneous	Percentage	MTP	Percentage
I trimester	18	75	1	4.2
II trimester	0	0	5	20.8
Total	**18**	**75**	**6**	**25**

- 4 out of 5 second trimester abortions were MTPs for unwed pregnancies.

- There was no case of septic abortion in the study group.

TYPE OF ABORTION



PERIOD OF ABORTION

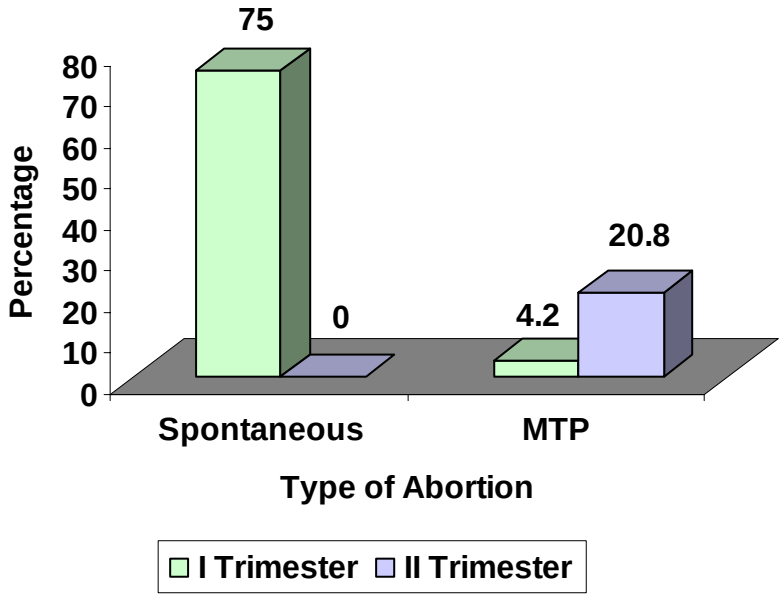


TABLE : 21

CONTRACEPTION AWARENESS

Knowledge	Number	Percentage
Present	204	68
Absent	96	32

- 1/3rd teenagers in study group were not aware of any contraceptive methods

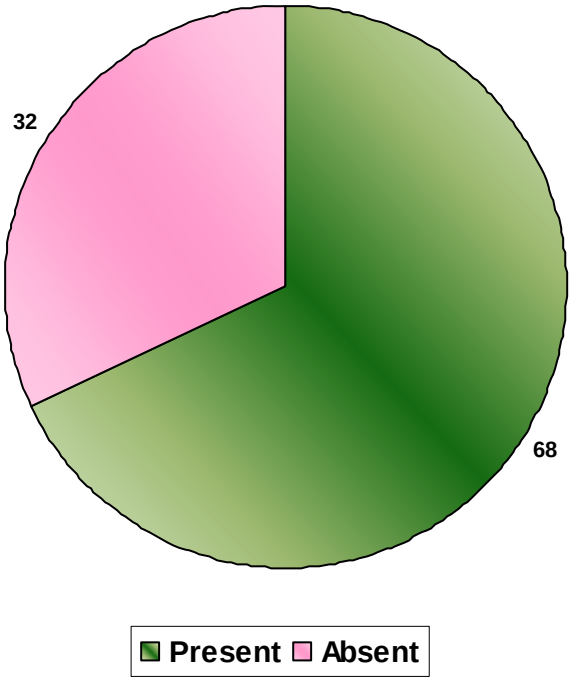
TABLE : 22

HIV AWARENESS

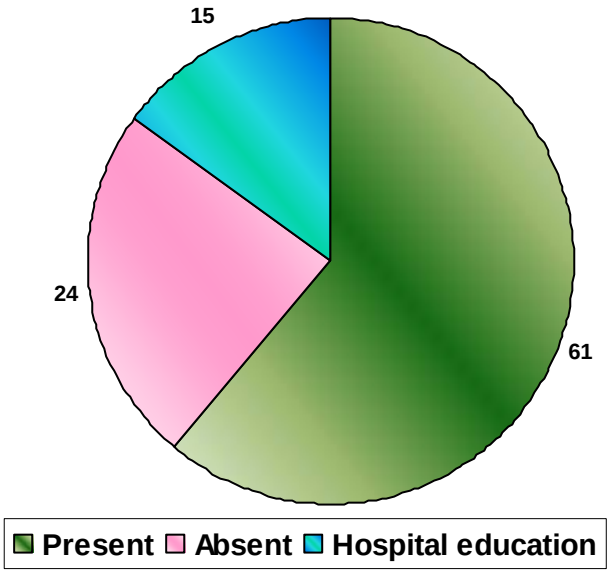
Knowledge	Number	Percentage
Present	183	61
Hospital Education	45	15
Absent	72	24

- 1/4th of the pregnant teenagers were not aware of HIV/AIDS.

CONTRACEPTION AWARNESS



HIV AWARENESS



Discussion

DISCUSSION

The present study on teenage pregnancy was undertaken with a view to know the proportion of adolescent pregnancy, to understand the determinants of teenage pregnancy and to study the foeto-maternal outcome in teenage pregnancy.

Incidence

During the study period of one year, there were 1110 teenage pregnancies including abortions, giving an incidence of teenage pregnancy to be **5.76%.**

The incidence in other Indian studies are:

Author	Year	Teenage pregnancy incidence (%)
Bhalerao AR	1988	6.3
Shobana Patted et al.	1989-93	5.33
Madhu et al.	2001	11.6
Arun Nayak	2000-02	6.28

The teenage birth rate of India according to a UNFPA (2002) is 45/1000 women aged 15-19 years. The variations in the incidence may be due to the differences in the population catered to.

Age Distribution

In the present study, 94% of the teenagers were between 18-19 years of age with only 6% below 18 years of age. None of them was below 15 years of age, which showed that the age of motherhood is advancing when compared to the past. 93% were between 17 and 19 years and 7% were in the age group 15-17 years in the study conducted by Bhalerao AR in 1988. Different study series were conducted by various authors about adolescent pregnancy outcome in various age groups from 15-19 years or less. Soula O et al's (2001) study includes pregnant teenagers under 15 years age whereas Goonewardane (2005) studied teenagers in two groups 13-16 years and 17-19 years. The findings in the studies of teenage pregnancy varied depending on the upper age limit in their study.

Parity

About 86.7% of the teenagers in the study group were primi gravidae and 13.3% were of higher order of pregnancy.

Author	Primi Gravida (%)	Gravida II and above (%)
Bhalerao AR	86.5	13.5
Shobana Patted et al.	82.2	17.8
Thekkekkara et al.	79.1	20.9

The present study is in accordance with that of Bhalerao AR in the aspect of parity.

Determinants of teenage pregnancy

Apart from maternal age, low level of education, low socio-economic status, age at menarche, age at marriage and socio-cultural factors are the major determinants of pregnancy in teenagers.

Literacy

In the present study, 14% of pregnant teenagers were illiterates, 25% of them had only primary school education and 9 out of the 300 teenagers had completed school education.

Study	Percentage of Illiterates
Iloki et al	7.24
Faucher et al	45.2
Thekkekkara T et al	15.4
Present Study	14

There is an inverse relationship between educational level and fertility. The NFHS-II shows that the total fertility rate is 1.5 children higher for illiterate women than for women with at least a high school education (1996-98). A study by Allen Guttmacher Institute found that in India, by seven years of education, pregnancy rates had come down by 34% in urban area and 54% in rural area in the 15 to 19 years age group. Improved female literacy and educational prospects have led to an increase in the age at first birth in areas such as Iran, Indonesia and the Indian state of Kerala.

Socio-economic status

Almost all of the teenagers in my study group belong to upper-lower or lower class of socio-economic status according to modified Kuppusamy's scale. Poverty is associated with increased rate of teenage pregnancy. In the study by Chahande MS (2000), 76.5% of urban and 84.7% of rural teenagers belonged to middle socio-economic status. Quereshi (1981) observed that women with low socio-economic status married earlier than those with higher socio-economic status. Imamura et al. (2007) in their meta analysis on the factors associated with teenage pregnancy commented that factors of socio-economic disadvantage, disrupted family structure and low educational level and aspiration appear consistently associated with teenage pregnancy. The same concept was concluded in the studies by Bhalerao AR (1988), Isaranurug S et al. (2006) and Goonewardane et al. (2005). Haldre K et al. (2005) in their study on the impact of socio-economic changes in Estonia concluded that major socio-economic changes including health care reforms over a period of 10 years has brought down both the teenage birth rate and abortion rate considerably. Even within a country, teenage pregnancy rates were more in the deprived areas than the affluent areas (Mcleod A, 2001).

Age at menarche and marriage

The age at menarche has come down over the years all over the world. Tiwari et al. (2003) has concluded that the age at menarche is a determinant of the age at marriage and first birth.

Early marriage implies that the woman is exposed to the risk of child bearing for a longer period. In the present study, about 1/5th of the teenagers were married by 16 years of age and 98% of study group married by 18 years of age though the legal age of marriage in India is 18 years only. The age at marriage has been steadily rising over time; nonetheless, 30% women aged 15-19 years have married.

Study	Average age at Menarche (Years)	Average age at Marriage (Years)
Chahande etal	-	16.7
Kokhar A	-	17.2
Sharma AK et al	13.8	17
Thekkekkara etal	-	16.5
Present Study	13.3	17.17

The present study is in coherence with the above studies in respect of age at menarche and marriage in teenagers.

Consanguineous marriage is common in India. 31.7% of teenagers in the study group had consanguineous marriage. Sureender S et al. reported that 48% of women in Tamilnadu marry their relatives. Their analysis revealed that women who marry their close relative had low age at marriage compared to those who married their distant relatives or non-relatives.

Once married, young girls are under a strong cultural and family pressure to conceive soon. The status of the young woman within her new family is dictated predominantly by this one factor. According to Jeejabhoy, 17% all adolescent females aged 13-19 years are already mothers or are pregnant with their first child. In our study, more than 80% of teenagers conceived within one year of marriage. This is similar to the study of Thekkekkara et al. (2003) where the mean interval between marriage and first pregnancy was 1.1 years.

The socio-cultural outlook also influences the age at marriage. In India, early marriage is a long-established custom. Joint-family system encourages early marriage and more children.

Factors affecting the foeto-maternal outcome of teenage pregnancy:

Growth

Epidemiological evidence suggests that maternal weight under 38 kg at the start of pregnancy and height under 145 cm places a woman at risk for complications during pregnancy or at delivery. Babies are likely to be low-birth-weight, die early in infancy or have poor growth and development. In the present study, 14% of the teenagers were of height less than 145 cm. Thame M and co-workers found that babies of teenage mothers had low birth weight and smaller head circumference than the control groups and hence hypothesized them to be physically immature. Steven S et al. (1994),

Sukanich et al. (1986) have found no difference in the outcome of pregnancy when compared to the older age group. In our study, 129 teenagers were less than or equal to 150 cm in height. Out of them 58.8% delivered vaginally. Of those who underwent caesarean section (41.2%) in this group (Ht≤150 cm) 32% was done for the indication CPD. 13% of the teenagers who were above 150 cm in height, underwent caesarean section, of which 9.5% was done for the indication CPD. Incidence of CPD is more in short-statured teenagers. Smith GC et al. (1992-98) concluded that first teenage births are not associated with increased risk of pregnancy outcome. The results of the present study contradict that of Steven S et al. (1994) and Sukanich et al. (1986) in this aspect. In the present study 11% of the pregnant teenagers were less than 40 kg of weight. Out of them, 76.7% had low birth weight babies (<2.5 kg). Hence maternal weight both pre-pregnancy as well as weight gain during pregnancy are important for the birth weight of the babies.

Antenatal care

Pregnant teenagers are least likely of all maternal age group to get early and regular prenatal care (March of Dimes). In the present study, there were 18.8% of unbooked cases with less than three antenatal visits throughout pregnancy. Maternal complications like anaemia, pre-eclampsia and eclampsia were more in unbooked cases. Shobana patted et al. found 40.4% of pregnant teenager to have had inadequate or nil antenatal check up. All of them were immunized against tetanus.

Maternal complications

Tyre et al. in 1978 felt that inadequate diet and increased demands of growth results in increased risk to pregnant teenager and her foetus. Kaminetzky et al. (1973) have shown relationship between maternal malnutrition and increased incidence of anaemia, pre-eclampsia, prematurity and low-birth-weight in teenagers. In the present study, 88% of teenagers had anaemia and 25.72% had gestational hypertension in the study group while 76.7% were anaemic and 12.3% had gestational hypertension in the control group with a statistical significance of p=0.001. The incidence of anaemia is high probably as the studied population was from a lower socio-economic status and also because of the criteria used. There was no significant difference between the severity of anaemia between the two groups (p=0.2). There were four cases of eclampsia in the study group and none in the control group. Three out of four cases were unbooked and the 4th case was booked outside and came only at the time of delivery. Many other authors have reported increased incidence of anaemia and gestational hypertension in their study on teenage pregnancy.

Author	Anaemia (%)	Gestational hypertension (%)
Bhalerao	25.5	10
Shobhana Patted et al.	25	22.64
Porozhonova et al.	13.6	32
Chahande MS	-	20.56
Geist RR	41	-
Present study	88	25.72

In the present study, 19.6% of the study group and 10.5% of the control group had preterm labour with a statistical significance of p=0.009. This is in accordance with the studies by various authors like Shobana Patted (12.83%), Bhalerao AR (16%), Chahande M.S (16%) and Asha swaroop (32%).

In our study, there was slight increase in still births/intra uterine deaths 5.4% in study group versus 1.8% in the control group with a p value of 0.02. This is probably due to the increased number of premature termination done in cases of severe pre-eclampsia. Chahande MS (2000) has reported an incidence of 5.4% still births in study group Vs 2.4% in control group. Studies by Sharma AK (1999) and Ambedkar (1999) also support this.

There was no significant difference in complications like abruption, malpresentations, twins, PROM, abruption and medical disorders between the study and control group.

Mode of delivery

In the present study, 65.22% of teenagers had spontaneous vaginal delivery compared to 65.26% in the control group; 3.98% of study group and 3.51% of control had assisted breech delivery; 4.71% instrumental delivery in study group as against 4.21% in the control group. The rate of caesarean section in study group is 24.28% and 26.32% in the control group. The above data indicates that there is no significant difference (p>0.05) in the mode of

delivery between teenagers and adults. Shobana Patted (1989-93) and Chahande MS (2000) have reported increased caesarean section rate of 31% and 27.3% respectively, whereas Dwyer et al. have reported low incidence (2.6%). The increased number of vaginal deliveries in our study is probably due to the smaller babies as hypothesized by Verma (1999) and Dia AT (1999-2000).

Perinatal complications

Incidence of low-birth weight babies was increased in teenagers (31.73%) compared to control group (17.24%) with a significant p value=0.002. In particular, there were only 12 term low birth weight babies in the control group as against 37 in the study group $p<0.001$. Incidence of prematurity was also found increased significantly in the study group (19.93%) compared with control group (10.34%), p=0.009. The following studies have also reported increased incidence of prematurity and low birth weight babies.

Author	Prematurity (%)	Low birth weight (%)
Bhalerao AR	16	46.2
Sarkar et al.	20.1	30
Chahande MS.	16	72.6
Present study	19.93	31.73

There was increased incidence of birth asphyxia and death in the early neonatal period in the study group, 14.39% and 6.21% respectively than the control group 6.21% and 2.76% respectively. The perinatal mortality rate in the present study is 10%. Pratinidhi has reported 6.72% and Bhalerao 6.52% perinatal mortality in their studies. The high perinatal mortality is probably due to the increased still births. The perinatal mortality for the institution during this period is 6.7%.

Maternal mortality

About 26 patients in the study group were admitted and treated in the Intensive Care Unit. Of these four were for eclampsia and four were for heart diseases and 15 of them for severe Pre-eclampsia with or without imminent signs and symptoms.

There were two maternal deaths in the study group. One was a case of AP Eclampsia admitted with unconsciousness, connected to ventilator after delivery and died due to Hypoxic Ischemic Encephalopathy and the other was a Rheumatic heart disease patient died one day after delivery due to pulmonary edema/CCF. This confirms the fact that pregnancy during teenage years remains major public health problem with lasting repercussions not only for the teenage mothers and their infants but also for their families and society as a whole.

Abortions

In the present study, there were 24 cases (8%) of abortions and MTPs. There were 12 cases of spontaneous abortions, 4 missed abortions, 2 cases of vesicular mole and 6 cases of MTPs. 4 out of 6 MTPs was done in second trimester as they were out of wed-lock pregnancies. One was terminated due to anomalous baby. All MTPs were done by induction with prostaglandins followed by check curettage. There was no post-abortal complication. No specific conclusions could be made as the sample size for abortions is small but this might only be the “tip of iceberg” as a large number of abortions are illegal in our country.

According to WHO, every year an estimated 2.0-2.4 million adolescents resort to abortions world over. In India, 30% of all induced abortions are performed in under 20. For every legal abortion, there are about 11 illegal abortions.

Adolescents undergo the same method of abortion as adults; however they have unique psychosocial needs, such as parental involvement and prevention of future unwanted pregnancies (Ludmer PI et al.).

Adolescents usually report late, in advanced pregnancy for abortions and require a relatively more complicated intervention and hence more complications. There was no septic abortion in the study group but Grimes et al. (1998) reported that the rate of sepsis following illegal abortion in teenagers is likely to be 50 times higher than sepsis in the induced abortions.

In many western countries where the teenage birth rates have come down in the past two decades, the abortion rate however has raised.

Contraception and HIV-Awareness

In our study, knowledge of contraception was absent in 32% of teenagers. Most of them were aware of condoms and/or IUCD. Knowledge about OC pills and post-coital contraception was minimal. Following delivery, most of them were indecisive and not wanting to adopt any contraception.

Awareness of AIDS was present in 61% of pregnant teenagers and 15% of teenagers got knowledge about HIV from the hospital when they came for antenatal check-ups. 24% of them were not aware of HIV/AIDS. Knowledge about other STIs was very poor. There was one case each of HIV positive and VDRL positive in our study. One patient in the study group had viral warts.

Summary

SUMMARY

The present study on the determinants and foeto-maternal outcome of Teenage pregnancy in 300 randomly selected cases for a period of one year (September 2006 to August 2007) in IOG showed the following facts.

Incidence of teenage pregnancies during the study period in this institution is 5.76%.

On analyzing the age at marriage, age at menarche, educational status and socio-economic status in teenagers, early age at marriage was found to be one of the prominent determinants of teenage pregnancy. The average age at marriage in the study was 17.17 years for the teenagers which is lower than the legal age of marriage (18 years) in India. Marriage-conception interval was found to be less than one year in 80% teenagers in the study group.

About 14% of the teenagers were illiterates and another 25% had only primary school education. Almost all of them belonged to lower socio-economic class.

The incidence of anaemia complicating pregnancy was found to be more common (88%) in the pregnant teenagers compared to the adult group (76.7%) (p=0.01). In this study, there were more low birth weight babies (31.73%) in teenage group compared to the adult group (17.2%) (p=0.002). In the present study, there were 18.8% of un-booked cases who had more

maternal or foetal complications. Thus it is concluded that maternal nutrition, growth and inadequate prenatal care utilization by the teenagers are the factors affecting the maternal and fetal outcome of teenage pregnancy.

Antenatal complications like anaemia (88%) pre eclampsia (25.72%) and preterm labour (19.6%) were found to be higher in pregnant teenagers compared to the control group with anaemia in 76.7%, pre-eclampsia in 12.3% and pre-term labour in 10.5% (p=0.001). There were four cases of eclampsia in the study group and none in the control group. In the present study, there was increased incidence of still births/IUD in the study group (5.4%) compared with control group (1.8%) p=0.05. Thereby it is concluded that complications like anaemia, pre-eclampsia, preterm labour, still births are increased in teenage pregnancy.

Analyzing the mode of delivery, spontaneous vaginal delivery occurred in 65.22% teenagers and assisted breech delivery in 3.98%, instrumental delivery in 4.71% and caesarean section in 24.28% of the teenagers. There was no statistically significant (p=0.8) difference in the modes of delivery between the study and the control group. There were 129 short statured teenagers in the study group who were less than 150 cm in height. 58.8% of the short statured teenagers had normal vaginal delivery in our study. In the others, who delivered by caesarean section, the most common indication was CPD (32%). In our study 11% of teenagers were less than 40 kg in weight. Out of them 76.7% had low birth weight babies (<2.5 kg).

In the present study, prematurity was found increased in babies born to teenagers (19.93%) compared with the control group (10.34%) (p=0.009). Also the number of term low birth weight babies in teenagers (13.65%) was more than that in the control group (4.14%) (P=0.001).

Increased number of early neonatal deaths was found in the study group (5.9%) than the control group (2.76%). The perinatal mortality was more in the study group due to prematurity and birth asphyxia. The perinatal mortality rate in the present study is 100 per 1000 live births, which is much higher than that for the institution (67 per 1000 live births). There were two maternal deaths in the study group.

Comparing the abortions in the study and control group, significantly there was no induced abortions in the control group, while there were 6 in the study group. Out of these, 4 were for unwed pregnancies, done in second trimester due to late reporting for termination. Even with liberalization of MTP services, adolescents usually come late with advanced pregnancy for termination.There was no case of septic abortion in the study group. No specific conclusions can be arrived regarding abortions from the present study as the sample size is small.

In our study, contraceptive awareness was present in 68% of pregnant teenagers. There was no knowledge about post-coital contraception. Majority of them are not willing to adopt any contraception in the post partum period. In the present study, HIV awareness was found to be nil in one fourth of the patients.

Conclusion

CONCLUSION

It may be concluded from the present study that the incidence of teenage pregnancies is showing a declining trend over the past years. But it has to be still reduced when compared with the developed countries.

Early age at marriage is one of the determinants of teenage pregnancy in our society. Teenage constitutes a “high risk group” in reproductive terms because of the assumed double burden of reproduction and growth.

There is increased incidence of maternal complications like anaemia, pre-eclampsia, preterm labour, still birth and neonatal complications like low birth weight and early neo-natal death. Hence adolescent pregnancy should be discouraged by increasing the age at marriage for girls. Illiteracy and poverty has to be combated for the betterment of women. Young women with low cognitive ability are at increased risk of early initiation of sexual activity and early pregnancy.

Adolescence is a period during which lifelong health behaviours are established. It is also the most vulnerable period exposed to peer pressure and sensational media. Steps should be taken for promoting responsible behaviours and reducing risks through health promotion.

Suggestions for improving the situation include

- ❖ Strict implementation of legal age of marriage.
- ❖ Comprehensive sex education in schools with the help of parents and community groups.
- ❖ Promoting the knowledge of contraception, safe sex and HIV awareness.
- ❖ Detection and correction of puberty menorrhagia.

Outcome for teens who are already pregnant can be improved by:

- ➢ Early booking and regular antenatal care.
- ➢ Nutritious diet in order to meet the needs for her own growth and that of the baby.
- ➢ Institutional care for delivery and post-partum contraception to limit further pregnancies.
- ➢ Social support for the care of the baby and for the economic independence of the mother.

Improving the status of women socially, economically, politically and implementing the interventions aimed at reducing teenage pregnancy will go a long way in achieving the goal of safe-motherhood in India. It is important to remember that "Adolescent health parameters are the real images of safe motherhood".

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Proforma

PROFORMA

Sl. No.:

Name: Age: IPNO: Occupation:

Income:

Address: Education:

Socio-economic class:

Date of Admission:

Date of Discharge:

Date of Delivery:

Duration of Hospital stay:

Obstetric formula: LMP: EDD:

Complaints at Admission:

Menstrual History: Menarche: Cycles:

Marital History: Duration: Consanguinity: Husband's age:

Obstetric History:

Pregnancy order	**Period of Gestation**	**Mode of labour**	**Outcome**	**Complications**	**Breast feeding Immunization Education**
G1					
G2					

Use of contraception:

Knowledge of contraception:

Knowledge of HIV:

Present pregnancy: Planned/Unplanned

Confirmed at:

Ist AN visit: Period of gestation:

Place: Govt./Private

Booking:

Total No. of AN visits:

No. of visits in last trimester:

Immunization:

Prophylactic Iron & Folate supplementation:

Knowledge of Health Care Services:

Past History:

Personal History:

Examination:

Ht: Temp:

Wt: Pulse:

BP:

Thyroid:

Breast:

Cardiovascular System Examination:

Respiratory System Examination:

Obstetrical Examination:

Labour: Onset of labour: Spontaneous/Induced

Progress of labour:

Complications:

Mode of Delivery: Indications:
(If instrumental/CS)

Baby: Birth Weight:

Apgar:

Complications:

If admitted: Cause and Progress

Early Neonatal Complications:

Contraceptive Awareness: Yes / No

If Yes, Method:

Mode of contraception adopted :

Awareness of HIV: Yes / No

If Yes, How: